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Biological Diversity: Global Conservation Needs and Costs*

Executive Summary

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BIODIVERSITY: GLOBAL CONSERVATION NEEDS AND COSTS

Jose I. dos R. Furtado
Centre for Integrated Development
19 Langford Green, Champion Hill
London SE5 8BX England, UK

EXECUTIVE SUMMARY

1. Biological diversity (or biodiversity) refers to the variety of and variability among living organisms, and the ecological complexes in which they occur. It embodies genetic diversity, species diversity and habitat and landscape (including ecosystem) diversity. The areas of basic global conservation needs identified by the Ad Hoc Working Group of Experts on Biological Diversity, at its second session in February 1990 should form the basis for a framework of a global strategy for conserving biological diversity over the next 10-20 years. Such a global strategy is urgently needed and should consider the following six elements:

i) Formation of a consensus on international priorities for maintaining biodiversity;

ii) Provision of a framework for detailed Regional Action Plans to stem the loss of biodiversity;

iii) Opportunities to use the Regional Action Plans to benefit local and indigenous populations;

iv) Development of an Emergency Action Plan for Protected Areas for regions that require special attention, and for new Protected Areas needed in the regions that scientists agree have the greatest biodiversity;

v) Research into the identification, clarification, promotion and sustainable use of tropical biological resources outside the main band of species now exploited;

vii) Research into the ways in which indigenous people harvest useful substances from tropical wild lands on a sustainable basis: and

vii) Cost of obtaining patent protection for new medicines and other chemicals derived from tropical species in order to overcome the private sector's reluctance to spend money on research in this area.

2. The implementation of such a global strategy for conserving biological diversity and promoting the sustainable use of natural resources in the future demands:

i) An understanding of the pace and unpredictable pattern of technological innovations for transforming natural resources into useful products and commodities, and their impacts on environmental services, in response to the changing perceptions of human needs, sustainable future and economic livelihoods concurrently at local and global levels:

ii) Reliable information for resource development and environmental management;

iii) Integrative strategies for conserving biological diversity with cultural and sustainable development; and

iv) Regional and global coordination of plans and programmes which promote local adaptation and implementation.

3. Implementation of a global strategy will require additional funds even though national states and development assistance agencies already expend billions of US dollars annually for nature protection and environmental management. Very little new information is being currently generated about biological diversity in the tropics and marine environments. This is where much of it resides and this information is of global significance. This situation is exacerbated by computerised collations which appear to provide "global" figures about biological diversity often without a comprehensive understanding of the complexity of the field.

4. It is difficult to estimate the magnitude of additional funds required for a global strategy due to the paucity of information available, and shortcomings in its clarity and reliability. The World Resources Institute has estimated the need for additional funds amounting to US$ 20-50 billion per year over a decade for a global strategy; the World Wide Fund for Nature Conservation (UK) has estimated the need for an additional US$ 100 million per year; and the Union of the Soviet Socialist Republics has estimated its additional needs in terms of US$ 1.00 billion per year.

5. While there is considerable variation in the figures and uncertainty about their basis, additional funds at least of the order of hundreds of millions to units of billions US dollars per year appear necessary for surveys and inventories, identification and authentication, technical assistance and cooperation in research, curation, education and training, traditional uses, management strategies and plans, monitoring and conservation coordination, priority projects and for the transfer of technology. This is necessary to conserve 10-20% of the biological diversity especially in tropical and marine environments over the next 10-20 years. The availability of any additional funds will have to be phased to match their absorptive capacity especially in developing countries in the tropics.

6. Formation of a consensus on international priorities for maintaining biological diversity will require regional and international meetings and consultations. International conservation priorities should include large areas with high and low biological diversity, besides small areas with high endemism, especially in the tropics and the marine environments. Consensus formation should be based on especialist consulations , broader technical consultations, governmental consultations, public awareness campaigns and/or consultations, and international advisory meetings. Although the costs of consensus formation are difficult to assess, they should require additional funds of about US$ 10 million per year in view of the cost of coordinating the International Biological Programme (IBP) at US$ 1-3 million per year and the costs of programme coordination of the World Conservation Union (IUCN) at US$ 2-3 million per year.

7. Regional Action Plans to stem the loss of biological diversity will require surveys and authentication of rich and threatened areas, technical assistance and cooperation for biological research, depositories and repositories, socio-economic research, education and training, management

strategies and plans, conservation and sustainable use technologies, monitoring and coordination, and priority demonstration projects especially in tropical and marine environments. In particular, they will need:

i) Reviewing of biological diversity especially for the tropics and the marine environment, and for microorganisms, invertebrates and lower vertebrates;

ii) Assessment by local communities, provinces and countries of their needs for knowledge on spatial areas, habitat and ecosystem types, taxonomic and species ranges, genetic variability, survey and use technologies, and technicians and expertise;

iii) Surveys of the state of depositories curating genetic and species diversity ex situ, and (for protected areas) harbouring unique and representative habitats and ecosystems in situ especially in the tropical and marine environments; as well as of repositories holding information on biological diversity at different levels;

iv) Assessments of the state of identification and authentication of biological diversity in tropical and marine environments especially in relation to taxa and classification systems of importance to the local and international economy, to management and technological innovation, and of importance to the strategic training of specialists;

v) Assessments of ecological processes important at the local, provincial and national levels for sustaining biological diversity in terms of key factors operational at each level and between different levels, the role and nature of perturbations, the causes of high species diversity and endemism, and the causes of threat and extinction;

vi) Involvement of various development sectors already engaged in resource transformation in assessing and regulating their own adverse impacts on biological diversity;

vii) Promotion of research for the conservation of biological diversity with focus on: the relation of species and landscape/seascape diversity to technological change; global biogeographic classification systems especially for tropical and marine environments; species diversity as long-term indicators of technological change; and effective conservation of genetic resources of wild species in protected areas systems;

viii) Development of a standardized international approach for assessing the effects of various technologies threatening biological diversity, for promoting an exchange of experiences, and for enabling integrated assessments of biological diversity based on their multiple outputs or benefits (e.g. energy, food, industrial materials) using an expanded "cost-benefit" approach;

ix) Training of technical experts in taxonomy and classification, autecology and community ecology, curation and husbandry, information storage and retrieval, and in survey and monitoring techniques, for conserving biological diversity of national and regional importance;

x) Assessing the effectiveness of various on-going regional action plans in promoting research, training and development of technologies for conserving biological diversity in situ and ex situ; focusing on plants, microorganisms and terrestrial and aquatic invertebrates for species conservation, and on tropical and marine environments for habitat and ecosystem conservation; catalysing national programmes; promoting development and sustainable use of resources, and the development of appropriate tools for integrated assessment; training local expertise in conservation technologies; and in establishing and maintaining networks of cooperating individuals and institutions;

xi) Incorporation of information management systems into the regional action plans;

xii) Assessment of protected areas in the tropics and the marine environment in relation to the ecological and socio-cultural processes that enable them conserve biological diversity, and to hierarchical linkages that could make them useful for global monitoring like the Biosphere Reserves;

8. The cost of discovering new varieties and variability suggest the need for tens of billions of US dollars. The Food and Agriculture Organization of the United Nations in collaboration with UNEP and other international organizations spends about US$ 11.5 million per year on ex situ and in situ depositories. The Tropical Forest Action Plan which spends US$ 1.1 billion per year allocates only 8% to conservation. On the basis of US$ 1-5 million per year per country and US$ 3-5 million per year per region, additional funds at least amounting to hundreds of millions of US dollars would be required.

9. Use of the Regional Action Plans to benefit local and indigenous populations would need technical assistance and cooperation to demonstrate the rights of the indigenous peoples, studies documenting traditions transmitted orally, and priority projects modernising sustainable use technologies. In particular, it will need:

i) Incorporation of information management systems that would also focus on traditional approaches and sensitively manage the interests of the indigenous peoples;

ii) Promotion of a six step process to conserve cultural diversity and benefit from it by: (a) giving appropriate value to the traditional rights, knowledge and skills of the indigenous peoples; (b) taking special measures to protect the rights of the indigenous peoples; (c) providing information on traditional resource management systems; (d) promoting the application of traditional wisdom to modern resource management (e) designing projects which benefit the indigenous peoples; and (f) designing projects which benefit from traditional knowledge.

10. In this regard, there were no estimates available except for US$ 900,000 per year in Chile. The traditional funds required for studies, technical assistance and priority projects in the above mentioned area should be around US$ 100 million per year.

11. An Emergency Action Plan for Protected Areas for regions that require special attention should include surveys of small and degraded areas, identification of new areas of high diversity for protection, monitoring of

threatened areas, and technical assistance for restoring and rehabilitating degraded areas and managing threatened areas.

12. The costs for such an Emergency Action Plan are difficult to estimate. Based on the need for Madagascar to spend US$ 6 million per year over 20 years and the expenditure of US$ 15 million per year by Denmark in landscape rehabilitation, there is a need for hundreds of millions to units of billions of US dollars for this Action Plan.

13. Research into the identification, clarification, promotion and sustainable use of tropical biological resources outside the main band of species now exploited will require focus on under utilized and marginal species, species associations and community types and landscape mosaics which have been discussed under Regional Action Plans. FAO spends at least US$ 300 million per year on testing and breeding programmes. The Consultative Group on International Agricultural Research spends another US$ 200 million per year. It would be reasonable to expect an additional US$ 100-300 million per year for broadening the use of the species diversity authenticated.

14. Research into the ways in which indigenous peoples harvest useful substances from tropical wild lands on a sustainable basis will need to focus on surveys of human management of common property and sustainable use technologies, and technical assistance, on biochemical screening of biomaterials and on demonstration of traditional use patterns. Some of the elements of this programme have been outlined earlier. There were no estimates available. On the basis of US$ 2-5 million per year per region, additional funds in the low hundreds of millions of US dollars would be required.

15. Obtaining patent protection for new medicines and other chemicals derived from tropical and marine species would require additional funds for promoting patent protection and the transfer of technology. Patent protection is complicated, expensive and requires sophisticated scientific and legal know-how to benefit from it. It costs a fraction of US$ 1 million to secure a good patent protection. Where biotechnological advances have been made on access to tropical species, there will be need to develop some mechanisms for compensating the natural sources of original genetic material. On the basis of US$ 1-5 million per year being available per region, additional funds of up to US$ 100 million would be required for promoting patent protection in tropical developing countries.

16. Developing countries, particularly in the tropics, experience high population growth rates which are a potential destabilising factor. There appears little scope for slowing down their economic growth rates. Instead, additional funds for conserving biological diversity should be targeted to promote the discovery of altenative economic livelihoods for their peoples.